

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of :
Satoshi KONDO et al. :
Serial No. NEW : **Attn: Application Branch**
Filed October 19, 2001 : **Attorney Docket No. 2001_1571A**

BLOCK DISTORTION DETECTION METHOD,
BLOCK DISTORTION DETECTION APPARATUS,
BLOCK DISTORTION REMOVAL METHOD, AND
BLOCK DISTORTION REMOVAL APPARATUS

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents,
Washington, DC 20231

THE COMMISSIONER IS AUTHORIZED
TO CHARGE ANY DEFICIENCY IN THE
FEES FOR THIS PAPER TO DEPOSIT
ACCOUNT NO. 23-0975

Sir:

Kindly amend the above-identified application as follows.

IN THE CLAIMS

Please amend claims 7, 8, 10 and 19-22 as follows.

7. (Amended) A block distortion detection method as defined in Claim 5, wherein the reduction of the volume of processing is carried out by reducing the number of pixels to be used for detection of block distortion.

8. (Amended) A block distortion detection method as defined in Claim 5, wherein the reduction of the volume of processing is carried out by reducing the number of strength levels of block distortion to be detected.

10. (Amended) A block distortion removal method for removing the block distortion which is detected by the block distortion detection method according to Claim 2, wherein the

pixel values of pixels in the vicinity of the block boundary are corrected according to the result of the detection of block distortion.

19. (Amended) A block distortion detection apparatus as defined in Claim 17, wherein the reduction of processing is carried out by reducing the number of pixels to be used for detection of block distortion.

20. (Amended) A block distortion detection apparatus as defined in Claim 17, wherein the reduction of the volume of processing is carried out by reducing the number of strength levels of block distortion to be detected.

21. (Amended) A block distortion detection apparatus as defined in Claim 17, wherein the reduction of volume of processing is carried out by executing no detection of block distortion using the motion vector when the resolution is high.

22. (Amended) A block distortion removal apparatus for removing block distortion detected by the block distortion detection apparatus according to Claim 13 comprising:

a block distortion remover for receiving the decoded image signal and the result of block distortion detection, and correcting the pixel values of pixels of the decoded image signal in the vicinity of the boundary, according to the result of block distortion detection.

Please add the following new claims.

25. (New) A block distortion detection method as defined in Claim 6, wherein the reduction of the volume of processing is carried out by reducing the number of pixels to be used for detection of block distortion.

26. (New) A block distortion detection method as defined in Claim 6, wherein the reduction of the volume of processing is carried out by reducing the number of strength levels of block distortion to be detected.

27. (New) A block distortion removal method for removing the block distortion which is detected by the block distortion detection method according to Claim 3, wherein the pixel values of pixels in the vicinity of the block boundary are corrected according to the result of the detection of block distortion.

28. (New) A block distortion removal method for removing the block distortion which is detected by the block distortion detection method according to Claim 5, wherein the pixel values of pixels in the vicinity of the block boundary are corrected according to the result of the detection of block distortion.

29. (New) A block distortion removal method for removing the block distortion which is detected by the block distortion detection method according to Claim 6, wherein the pixel values of pixels in the vicinity of the block boundary are corrected according to the result of the detection of block distortion.

30. (New) A block distortion detection apparatus as defined in Claim 18, wherein the reduction of processing is carried out by reducing the number of pixels to be used for detection of block distortion.

31. (New) A block distortion detection apparatus as defined in Claim 18, wherein the reduction of the volume of processing is carried out by reducing the number of strength levels of block distortion to be detected.

32. (New) A block distortion detection apparatus as defined in Claim 18, wherein the reduction of volume of processing is carried out by executing no detection of block distortion using the motion vector when the resolution is high.

33. (New) A block distortion removal apparatus for removing block distortion detected by the block distortion detection apparatus according to Claim 14 comprising:

a block distortion remover for receiving the decoded image signal and the result of block distortion detection, and correcting the pixel values of pixels of the decoded image signal in the vicinity of the boundary, according to the result of block distortion detection.

34. (New) A block distortion removal apparatus for removing block distortion detected by the block distortion detection apparatus according to Claim 17 comprising:

a block distortion remover for receiving the decoded image signal and the result of block distortion detection, and correcting the pixel values of pixels of the decoded image signal in the vicinity of the boundary, according to the result of block distortion detection.

35. (New) A block distortion removal apparatus for removing block distortion detected by the block distortion detection apparatus according to Claim 18 comprising:

a block distortion remover for receiving the decoded image signal and the result of block distortion detection, and correcting the pixel values of pixels of the decoded image signal in the vicinity of the boundary, according to the result of block distortion detection.

36. (New) A block distortion removal method as defined in Claim 27, wherein the correction of pixel values is carried out using a filter having different characteristics according to the strength levels of block distortion.

37. (New) A block distortion removal method as defined in Claim 27 wherein, after the pixels in the vicinity of the boundary are subjected to a predetermined filtering, the correction of

pixel values is carried out by using pixel values which are obtained by performing weighted-averaging on the pixels of the decoded image and the filtered pixels, according to the strength of the block distortion.

38. (New) A block distortion removal method as defined in Claim 28, wherein the correction of pixel values is carried out using a filter having different characteristics according to the strength levels of block distortion.

39. (New) A block distortion removal method as defined in Claim 28 wherein, after the pixels in the vicinity of the boundary are subjected to a predetermined filtering, the correction of pixel values is carried out by using pixel values which are obtained by performing weighted-averaging on the pixels of the decoded image and the filtered pixels, according to the strength of the block distortion.

40. (New) A block distortion removal method as defined in Claim 29, wherein the correction of pixel values is carried out using a filter having different characteristics according to the strength levels of block distortion.

41. (New) A block distortion removal method as defined in Claim 29 wherein, after the pixels in the vicinity of the boundary are subjected to a predetermined filtering, the correction of pixel values is carried out by using pixel values which are obtained by performing weighted-averaging on the pixels of the decoded image and the filtered pixels, according to the strength of the block distortion.

42. (New) A block distortion removal apparatus as defined in Claim 33, wherein the correction of pixel values is carried out using a filter having different characteristics according to the strength levels of the block distortion.

43. (New) A block distortion removal apparatus as defined in Claim 33 wherein, after the pixels in the vicinity of the boundary are subjected to a predetermined filtering, the correction of pixel values is carried out using pixel values which are obtained by performing weighted-averaging on the pixels of the decoded image and the filtered pixels, according to the strength of the block distortion.

44. (New) A block distortion removal apparatus as defined in Claim 34, wherein the correction of pixel values is carried out using a filter having different characteristics according to the strength levels of the block distortion.

45. (New) A block distortion removal apparatus as defined in Claim 34 wherein, after the pixels in the vicinity of the boundary are subjected to a predetermined filtering, the correction of pixel values is carried out using pixel values which are obtained by performing weighted-averaging on the pixels of the decoded image and the filtered pixels, according to the strength of the block distortion.

46. (New) A block distortion removal apparatus as defined in Claim 35, wherein the correction of pixel values is carried out using a filter having different characteristics according to the strength levels of the block distortion.

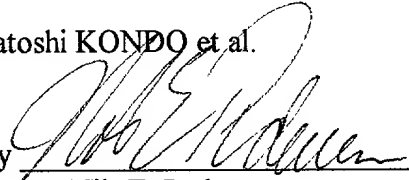
47. (New) A block distortion removal apparatus as defined in Claim 35 wherein, after the pixels in the vicinity of the boundary are subjected to a predetermined filtering, the correction of pixel values is carried out using pixel values which are obtained by performing weighted-averaging on the pixels of the decoded image and the filtered pixels, according to the strength of the block distortion.

REMARKS

The present Preliminary Amendment is submitted to delete the multiple dependency of the claims, thereby placing such claims in condition for examination and reducing the required PTO filing fee.

Respectfully submitted,

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between two pixels across the boundary of blocks/motion-compensation-units which is the boundary of adjacent blocks as well as the boundary of adjacent motion compensation units, and a second difference in pixel values between two pixels which belong to a block in the vicinity of the boundary of blocks/motion-compensation-units; and

performing detection of block distortion at the boundary of blocks/motion-compensation-units, using the values of the first and second differences and the amount of motion in motion compensation units across the boundary of blocks/motion-compensation-units, by a detection method in which the volume of processing decreases as the resolution of the decoded image signal becomes larger.

7. A block distortion detection method as defined in Claim 5 ~~or~~ ✓
~~6~~, wherein the reduction of the volume of processing is carried out by reducing the number of pixels to be used for detection of block distortion.

8. A block distortion detection method as defined in Claim 5 ~~or~~ ✓
~~6~~, wherein the reduction of the volume of processing is carried out by reducing the number of strength levels of block distortion to be detected.

9. A block distortion detection method as defined in Claim 6,

wherein the reduction of the volume of processing is carried out by executing no detection of block distortion using the amount of motion when the resolution is high.

10. A block distortion removal method for removing the block distortion which is detected by the block distortion detection method according to ~~any of Claim 2, Claim 3, Claim 5, and Claim 6,~~ wherein the pixel values of pixels in the vicinity of the block boundary are corrected according to the result of the detection of block distortion.

11. A block distortion removal method as defined in Claim 10, wherein the correction of pixel values is carried out using a filter having different characteristics according to the strength levels of block distortion.

12. A block distortion removal method as defined in Claim 10 wherein, after the pixels in the vicinity of the boundary are subjected to a predetermined filtering, the correction of pixel values is carried out by using pixel values which are obtained by performing weighted-averaging on the pixels of the decoded image and the filtered pixels, according to the strength of the block distortion.

13. A block distortion detection apparatus comprising:

of processing by at least one of the pixel value inspector and the motion vector inspector decreases.

19. A block distortion detection apparatus as defined in Claim 17 ~~or 18~~, wherein the reduction of processing is carried out by reducing the number of pixels to be used for detection of block distortion.

20. A block distortion detection apparatus as defined in Claim 17 ~~or 18~~, wherein the reduction of the volume of processing is carried out by reducing the number of strength levels of block distortion to be detected.

21. A block distortion detection apparatus as defined in Claim 17 ~~or 18~~, wherein the reduction of volume of processing is carried out by executing no detection of block distortion using the motion vector when the resolution is high.

22. A block distortion removal apparatus for removing block distortion detected by the block distortion detection apparatus according to ~~any of Claims 13, 14, 17, and 18~~, comprising:

a block distortion remover for receiving the decoded image signal and the result of block distortion detection, and correcting the pixel values of pixels of the decoded image signal in the vicinity of the boundary, according to the result of block